



Sustainable Outdoor Drylot Farrow-to-Finish Hog Enterprise Budget

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Introduction

Outdoor hog producers face both opportunities and challenges. Economic opportunities include the growing number of pork buyers who are looking for niche products produced locally and produced in certain ways. Economic challenges include higher costs of production and achieving a sufficient size of enterprise to be viable. Environmental opportunities include the value of nutrients produced by the hogs if used in crop production. Environmental challenges include preventing those nutrients from polluting surface and ground waters.

Hog manure and urine contain large amounts of nitrogen, phosphorus and potassium. Phosphorus can build up to high levels in the soil populated by hogs. If not properly managed, phosphorus and nitrogen can contaminate surface and ground waters. Phosphorus contamination can occur through soil erosion that carries this nutrient to surface waters. If the level of phosphorus in soil reaches very high levels, a portion can become soluble, increasing the potential for leaching into ground water. Nitrogen is a more soluble nutrient and has the potential for entering both surface and ground waters. To prevent these environmental problems, outdoor hog enterprises can be combined in a rotation with salable crops to extract and export these nutrients from areas previously in hogs. In addition, buffers may be needed to prevent erosion and run-off from reaching surface waters.

Farrow-to-finish is the production system most commonly used by producers serving niche markets because the producer can control all stages from breeding the sows through marketing the finished hog. In some cases, the producer also manages processing the hogs and marketing the meat. This enterprise budget is based on the production and sale of finished hogs as live animals.

There are several uses for an enterprise budget. One use is by an existing producer to estimate costs and returns, say, using data for a particular year. A second use is to make projections for the coming year, as an aid to decision making. A prospective producer might use a budget to explore new enterprises. An enterprise budget incorporates all the economic costs and returns attributable to the hog enterprise. Expenses include operating costs, the ownership or fixed costs associated with investments in the enterprise, the cost of hired labor and a charge for unpaid family labor. General farm overhead expenses and land charges are not included because these are farm not enterprise costs.

This budget is based on a hog farming system believed to be fairly representative of what might be found under North Carolina conditions. Prices are based on recent history and expectations for the medium term future. It was created using Excel© and this version is available on-line at http://www.ag-econ.ncsu.edu/extension/Ag_budgets.html. The various worksheets can be modified to generate costs and returns for an enterprise of a different size and type than the one in this budget or for different

levels of animal performance and prices. However, anyone using the budget spreadsheet must accept responsibility for the information he generates and acts upon.

Marketing

Changing consumer tastes and preferences create niche market opportunities for many farmers, including hog producers. Segments of the consuming public are looking for food products with specific attributes. These include foods produced by particular production methods, such as, produced without antibiotics and added hormones, natural, free range, grass fed, raised humanely. Producers must comply with USDA certification regulations in order to label their foods "Organic." If used on labels, some other terms such as grass fed and natural must be backed up by production methods that meet USDA definitions. Increasingly, consumers are seeking products that are locally produced or raised on a family farm, although these terms do not have a strict definition. Some consumers have preferences as to where they buy food, including direct purchases from farms, at farmers markets, in Community Supported Agriculture groups, in specialty retail stores, and in restaurants featuring these types of food products. Other features also add value to a purchasing experience including on-farm activities such as corn mazes and hay rides. Nevertheless, the traditional meat qualities of tenderness, juiciness, flavor, and leanness still matter, as does consistency of product from one purchase to the next.

Compared to farmers who supply traditional commodity markets, producers have some discretion over prices charged but consumers still show some price sensitivity and compare prices among competing products. Producers are strongly advised to do some market research and identify their target markets before developing their production systems. The needs and desires of these customers should influence the design of the hog production system, including overall volume of production, seasonality, the choice of breed, and target market weights. For direct marketers, meat cuts, product type, and package size and type are important also.

Dry Lot Production

One basis for a sustainable production system is that it produces hogs in a rotation with salable crops that will remove the nutrients generated by the hogs. It is necessary to remove the crops from the hog production area to achieve nutrient balancing. In addition, buffers are required to trap soil and nutrients in order to protect surface waters.

Cropping options include commodity crops, specialty crops and hay crops, each with a different nutrient requirement to achieve optimum yield. Crop type and yield determine nutrient uptake and removal. The nutrient uptake by crops in a rotation will help determine how many hogs per acre can be produced in a sustainable manner. The greater the annual crop uptake of nutrients the more hogs can be produced per acre and vice versa. Alternatively, a longer period of crop production between periods of hog production will also increase nutrient removal. If the goal is to maintain stable levels of phosphorus in the soil it is likely that two years or more of crops would be required to remove the nutrients produced by a farrow-to-finish hog enterprise in one year. Also, each of the crops selected must fit with the available farm resources, including labor, and fit the overall goals and plans for the farm.

The representative farm for this budget produces hogs on an area for 12 months followed by two years of cropping. This system requires three blocks of land and the infrastructure and equipment used for the hog operation must be moved each year to a new block. Sixteen acres are allocated to the hogs each year and an additional 32 acres are cropped, for a total of 48 acres. A cover crop is required after the hogs are moved and before the salable crop is planted. (The need for a cover crop and whether to charge the cost to the hogs or to the crop enterprise will be a farm specific decision.) Additional acreage is required for access lanes and buffers to prevent run-off into surface waters.

The system used as the basis for the budget assumes 24 sows, 2 Boars, 2 litters born per sow per year, 7 pigs weaned per litter, and a 3% death loss after weaning. The operation produces and sells 326 250-pound hogs per year. Sows farrow year round in order to supply the needs of the market, in groups of 4 each month. Finishing hogs are grouped by age and size. The hog acreage is subdivided into paddocks for groups of hogs at similar stages in the production cycle. Five acres is allocated to sows and divided into six paddocks. Growing hogs use 11 acres in six paddocks. Paddock size is calculated to distribute the nutrients produced by the hogs as evenly as possible across the total area.

Enterprise Investments

The infrastructure for the hog paddocks includes fencing and gates, watering points and feeders. These costs will be site specific and depend both on the farm layout and any existing infrastructure suitable for a hog operation. For the model farm used in the budget, fences are all electrified with three wires attached to T-posts, including perimeter and internal fencing. Each of the 12 paddocks has a watering point, feeders and artificial shade. Equipment needs likely include a tractor with implements, a pickup truck, and a livestock trailer. Some of these items may be shared with other farm enterprises. The budget includes equipment for seeding and land leveling.

A final category of investment is the breeding livestock – sows and boars—which may be purchased or raised on the farm. The budget is based on 24 sows and 2 boars. Replacement animals, gilts and boars, are assumed to be purchased in order to simplify the budget. Sows are replaced every three years and boars every other year. Note that no land charges are included in the budget.

Production costs

There are three types of cost to consider; operating or variable costs of production, the ownership or fixed costs associated with the hog enterprise, and labor costs or charges including a charge for family labor. Feed costs are by far the largest component of operating costs. Other operating expenses include supplies and miscellaneous items, repairs and maintenance expenses associated with fencing, water systems, any other facilities, and machinery and equipment, sales expense, and the cost of working capital. Additional items may include cover crop expenses and predator control costs, for example, keeping a dog (assumed to be unnecessary in this budget).

For the enterprise budget, feed requirements and costs were generated from a feed budget spreadsheet available on-line at http://www.ag-econ.ncsu.edu/extension/Ag_budgets.html. The feed budget includes daily feed requirements for each type of livestock, days on feed, waste %, and unit cost of feed by animal category to calculate total feed amounts and cost. Other operating expenses listed in the budget include estimated cover crop expenses, supplies and miscellaneous items. Repair and maintenance expenses associated with fencing and water systems are estimated as a percentage of the new investment cost. These are itemized in Table 1 of the budget. If the initial investments are in used items with a lower initial cost to the farm then the annual repair and maintenance cost will be a larger percentage of the purchase price. Equipment operating expenses include repairs, maintenance and fuel cost. These are calculated in Table 2 of the budget. The cost of working capital is estimated at a 5.5% annual interest rate on the average operating expenses (that is, on one-half of the annual total). Sales expenses are assumed to be paid by the buyer.

Ownership costs are the annual charges necessary to recoup investments used by the hog enterprise. Cost categories are depreciation, interest on investment, property taxes, and insurance. These costs are summarized in three categories: Facilities, fencing, water; Machinery & equipment; and Livestock. These are itemized in Table 1 of the budget.

There is a cost assigned to all labor used by the hog enterprise, including both hired labor and a charge assigned to the value of family labor. Labor is separated into labor for operating machinery and equipment and livestock labor. The former is estimated in Table 2 of the budget. Livestock labor is

associated with tasks not requiring equipment and any time spent while equipment is idle, such as, labor for checking, moving and working with the hogs or repairing fences.

Revenue

Potential sources of revenue include sales of feeder pigs, finished (top) hogs, cull breeding stock, and animals sold for breeding stock. The enterprise budget includes only sales of top hogs and cull breeding stock. No credit is given for the value of the nutrients provided to the following crops because the value will be crop specific. Additional crop budgets are required to assess the profitability of each crop and the profitability of the combined hog and cropping enterprises.

Net Returns

The budget includes three measures of net returns: Returns over Operating Expenses, Returns over Operating Expenses and Ownership Costs, and Returns over All Listed Expenses. Note that an enterprise budget only includes costs and returns that are specific to that enterprise and does not include general farm expenses such as land costs and farm overhead. For this reason, Returns over All Listed Expenses is also referred to as Returns to Land, Overhead, Management and Risk. However, note that these are only partial measures of profit. The preferred estimates of profit are returns on assets (investment), in dollar terms or as a rate of return, or returns to management. These measures are more appropriate to the financial performance of the whole farm. Additional measures of enterprise profitability include the margins or ratios of revenue compared to various expense categories.

Risk

Agriculture is inherently risky. Anyone making projections is advised to evaluate the robustness of their estimates by posing “what if” questions about the levels of animal performance, costs and returns. Table 3 of the enterprise budget provides a simplified assessment of risk by estimating the effect of 10% changes in costs and returns on the Return over All Listed Expenses.

Other Considerations

The economic viability of the whole farm business depends on more than the financial performance of one enterprise. By definition, an enterprise budget looks only at the specific investments, costs and returns attributable to that enterprise. Farm overhead costs and land related costs are not included. There may be complementary relationships with other enterprises, as noted above, for example, using crops to utilize nutrients from the hog enterprise.

There may also be benefits to small landowners if running a farm enterprise allows the owner to qualify for lower property taxes under the North Carolina Agricultural Use Value rules. Qualifying to file taxes as a farmer instead of a non-farm individual may also confer tax advantages.

The whole farm must meet the family goals, including lifestyle, profitability, wealth and solvency, and cash flow. Environmental stewardship may be one of the family goals. For families with outside income and strong preferences to live on a particular small farm, the final decision may be one of choosing the farming option that best fits this lifestyle decision.

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Outdoor Hogs: Drylot Farrow-to-Finish. A template to estimate annual revenue, operating expenses, asset ownership (fixed) costs, and returns to land, overhead and management.
 24 sows and 2 boars managed on 16 acres of drylot in rotation with crops. Land for hogs does not include land for buffers, sacrifice areas, access lanes, or farm buildings.

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Category	Description	Unit	Price/Unit	Quantity	Value	Comments
OPERATING INPUTS						
Cover crop	Winter annual	Acre	\$60.00	16.0	\$960	
Cover crop		Acre	\$0.00	0.0	\$0	
Sow Feed 1	Gestation	Cwt.	\$18.50	264.8	\$4,899	
Sow Feed 2	Lactation	Cwt.	\$18.50	275.9	\$5,104	
Sow Feed 3	Dry, open	Cwt.	\$18.50	54.6	\$1,010	
Creep feed		Cwt.	\$25.00	70.7	\$1,768	
Boar feed		Cwt.	\$18.50	46.1	\$853	
Growing hog feed		Cwt.	\$18.50	1,029.2	\$19,040	
Finishing hog feed		Cwt.	\$18.50	1,440.9	\$26,657	
Other feed		Cwt.	\$0.00	0.0	\$0	
Minerals	In feed	Head	\$0.00	0.0	\$0	
Vaccines, dewormers, meds		Head	\$2.50	352.0	\$880	
Vet services		Year	\$200.00	1.0	\$200	
Breeding stock	1 Boar, 8 gilts	Head	\$300.00	9.0	\$2,700	
Supplies	Bedding, per sow	Head	\$20.00	24.0	\$480	
Other	E.g., Predator control	Head	\$0.00	0.0	\$0	
Miscellaneous	Per sow and boar	Head	\$5.00	26.0	\$130	
Fence & Water Repair	% of initial investment	%	2.0%	\$17,900	\$358	
Facilities Repair	% of initial investment	%	2.0%	\$32,820	\$656	
Equipment operating	From Table 2				\$1,877	
Sales Comm. & transport	Buyer pays	Head	\$0.00	0.0	\$0	
Annual operating capital ^b	Interest rate, annual	\$	5.5%	\$28,304	\$1,557	
TOTAL OPERATING COSTS					\$69,128	
OWNERSHIP COSTS						
Facilities, fencing, water	Depreciation, interest, prop. tax, insurance				\$8,756	
Machinery & equipment	Depreciation, interest, prop. tax, insurance				\$1,719	
Livestock	Interest, prop. tax, insurance				\$141	
TOTAL OWNERSHIP COSTS					\$10,616	
LABOR COSTS						
Machinery operator labor, From Table 2					\$5,015	
Livestock labor	Work, check livestock	\$/hr.	\$10.00	440	\$4,400	
TOTAL LABOR COST					\$9,415	
TOTAL COST					\$89,160	
GROSS REVENUE^c						
Male feeder pigs	Note numbers, weight, etc	Head	\$75.00	0	\$0	
Female feeder pigs	" "	Head	\$75.00	0	\$0	
Finished male hogs	163 head at 250 lb/head		\$1.00	40,750	\$40,750	
Finished female hogs	" "	Head	\$1.00	40,750	\$40,750	
Cull sows	" "	Head	\$220.00	8	\$1,760	
Gilts for breeding stock	" "	Head	\$0.00	0	\$0	
Boars	" "	Head	\$220.00	1	\$220	
TOTAL REVENUE					\$83,480	
RETURNS OVER OPERATING EXPENSES					\$14,351.77	
RETURNS OVER OPERATING EXPENSES AND OWNERSHIP COSTS					\$3,735.36	
RETURNS OVER ALL LISTED EXPENSES^d					(\$5,679.64)	
RETURNS OVER ALL LISTED EXPENSES PER SOW		Average No. of Sows		24	-\$236.65	
RETURNS OVER ALL LISTED EXPENSES PER ACRE		No. of Acres		16	-\$354.98	

^a Annual operating costs can be actual costs or estimated using NCSU or other Forage Enterprise Budgets.

^b Interest calculated on one-half of operating input costs, except sales expense.

^c Revenues from sales of feeder pigs and cull breeding stock depend on numbers, pay weight at sale and price. Sale prices vary with type of market outlet, time of year, weight, frame, and fleshiness.

^d Returns to Land, Overhead, Management, and Risk

DRYLOT FARROW-TO-FINISH HOG ENTERPRISE BUDGET

Budget Sows-OSO1
August 2011

Table 1. Investment in specialized facilities & equipment and pro-rated share of annual ownership expenses

Category	Life	Initial	Salvage	Depreciation ^a	Interest ^b	Tax & Ins. ^c	Total	Share to	Share to
	Years	Cost	Value				DITI	Enterprise	Enterprise
		\$	\$	\$	\$	\$	\$	%	\$
Interest and Tax + Insurance Rates==>					5.00%	0.12%			
Facilities ^d :									
Sow huts	10	3,000	0	300	75	4	379	100.0%	379
General purpose bldg.	15	16,000	0	1,067	400	19	1,486	50.0%	743
Perimeter fence, gates	5	6,264	0	1,253	157	8	1,417	100.0%	1,417
Internal fence	5	3,986	0	797	100	5	902	100.0%	902
Water Supply	5	7,650	0	1,530	191	9	1,730	100.0%	1,730
Handling facilities	20	0	0	0	0	0	0	100.0%	0
Movable Shelters	5	8,320	0	1,664	208	10	1,882	100.0%	1,882
Feeders, Feed Storage	10	13,500	0	1,350	338	16	1,704	100.0%	1,704
Other facilities	5	0	0	0	0	0	0	0.0%	0
Feeding, pasture & livestock management:									
4-wheeler	10	12,500	3,250	925	394	15	1,334	20.0%	267
Tractor	20	19,000	4,940	703	599	23	1,324	25.0%	331
+ spinner seeder	10	2,300	598	170	72	3	245	10.0%	25
+ front end loader	20	3,000	780	111	95	4	209	10.0%	21
+ blade or harrow	10	600	156	44	19	1	64	10.0%	6
+ other tractor equip.	10	1,000	260	74	32	1	107	25.0%	27
Pickup	10	27,500	6,875	2,063	859	33	2,955	10.0%	295
+ stock trailer	10	7,000	1,820	518	221	8	747	100.0%	747
Other equipment	1	0	0	0	0	0	0	0.0%	0
Predator control animal	10	0	0	0	0	0	0	100.0%	0
Sows ^e	3	4,800		--	120	6	126	100.0%	126
Boars ^e	2	600		--	15	1	16	100.0%	16
TOTAL									10,616

^a Depreciation = (Initial cost - Salvage value) / years of life

^b Interest on average investment = ((Initial cost + Salvage value) / 2) X interest rate specified

^c Property taxes and insurance on facilities and equipment = Initial investment X tax + insurance rates specified.

^d Specialized hog facilities and equipment are movable to facilitate the subsequent cropping on the area used by the hogs.

^e Sows and boars are not depreciated. Cost of maintaining the herd are captured through replacement purchases and cull animal sales.

Table 2. Operating expense for machinery and equipment used in the enterprise

Operation and Item	Horse Power	Repairs & Maint. ^a	Repairs & Maint.	Share to Enterprise	Est. Fuel Use	Fuel Cost	Fuel & Lube ^b	Hours of Use/Year	Total Op. Cost/Year	Labor Cost ^c	Total Expense
		%	\$/Year	\$	Gals/hr	\$/Hour	\$/Hour	Hours	\$	\$	\$
Fuel cost per gallon & Labor cost per hour ==>>>							3.75			10.00	
Feeding, pasture & livestock management:											
4-wheeler		2%	250.00	25.00	1.0	3.75	4.31	182.5	812.03	\$1,825.00	\$2,637.03
Tractor	35	2%	380.00	76.00	1.54	5.78	6.64	136.0	979.21	\$1,360.00	\$2,339.21
+ spinner seeder		1%	23.00	4.60	0	0.00	0.00	12.0	4.60		\$4.60
+ front end loader		2%	60.00	15.00	0	0.00	0.00	52.0	15.00		\$15.00
+ blade or harrow		1%	6.00	1.50	0	0.00	0.00	20.0	1.50		\$1.50
+ other tractor equip.		2%	20.00	2.00	0	0.00	0.00	52.0	2.00		\$2.00
Pickup		1%	275.00	27.50	2.5	9.38	0.00	183.0	27.50	\$1,830.00	\$1,857.50
+ stock trailer		2%	140.00	35.00	0	0.00	0.00	120.0	35.00		\$35.00
Other equipment		1%	0.00	0.00	0	0.00	0.00	0.0	0.00		\$0.00
TOTAL									1,877	5,015	6,892

^a Repairs and maintenance costs are calculated as a % of the initial cost in Table 1. Percentages are higher for equipment that is bought used.

^b Fuel cost plus lube costs estimated as 15% of the fuel cost.

^c Labor cost or charge includes an additional 15% allowance for inspection, equipment adjustments, cleaning up, travel, etc. Include labor that does not require equipment as "Livestock labor" directly in the budget, e.g., working cattle, moving fence, checking gate.

Table 3. SENSITIVITY ANALYSIS

This table shows the net returns over all listed expenses (also called returns to land, overhead, management and risk) a measure of profit, under various assumptions about costs and returns. Specifically, the cost and returns shown in the enterprise budget on the first page are believed to be fairly representative of conditions in North Carolina. However, there is a wide variation in farm performance from one farm to another and costs and sale prices can change rapidly from year-to-year. The table shows the effects of returns that are 10 percent higher and lower than for the base budget. Similarly, the effects of total costs that are 10 percent higher and lower are shown also.

NET RETURNS ABOVE ALL LISTED EXPENSES (Returns to land, overhead, management and risk):

		REVENUE		
		-10%	Base	10%
		Lower	Budget	Higher
	-10%	-\$5,112	\$3,236	\$11,584
COST	Base	-\$14,028	-\$5,680	\$2,668
	+ 10%	-\$22,944	-\$14,596	-\$6,248